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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,098	07/19/2006	Claudio G Jacobson	2002	1715

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EDWARD LANGER
c/o SHIBOLETH YISRAELI ROBERTS ZISMAN & CO.
1 PENN PLAZA-SUITE 2527
NEW YORK, NY 10119

EXAMINER	
BLEVINS, JERRY M	
ART UNIT	**PAPER NUMBER**
2883	

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08/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,098	JACOBSON, CLAUDIO G	
	Examiner	Art Unit	
	Jerry Martin Blevins	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 6-10, 13, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,173,105 to Aksyuk et al.

Regarding claim 1, Aksyuk teaches a MEMS variable optical attenuator device (Figures 1 and 4, column 1, line 63 – column 2, line 18), comprising: a substrate (19) having formed therein means for securing (20A) at least one optical waveguide; at least one optical waveguide (11,12), each having a gap (13) between segments thereof, wherein said gap is formed once said at least one optical waveguide is secured by said securing means, thereby to insure optical alignment between said optical waveguide segments (column 1, line 63 – column 2, line 18, column 2, line 53 – column 3, line 6, column 3, lines 23-50), shutter means (14) mounted proximate said gap (Figures 1 and 4) formed in said at least one optical waveguide, said shutter means being movable inside said gap (Aksyuk claims 3 and 9), in a dynamically variable amount as required, so as to block controllably a portion of the power of an optical signal propagating in said gap (column 3, lines 23-50), between said optical waveguide segments; and shutter

actuation means (15, 16) to move said shutter means controllably and dynamically to any required position within said gap.

Regarding claim 2, Aksyuk teaches that the at least one optical waveguide is an optical fiber (column 1, line 63 – column 2, line 18).

Regarding claim 6, Aksyuk teaches that said gap is formed so as to have featured cross-section and geometrical form, designed to accommodate a specific geometrical shape of said shutter means (Figures 1 and 4 show that the gap is formed such that a rectangular cross-sectioned shutter is accommodated).

Regarding claim 7, Aksyuk teaches that said shutter means is capable of moving in a direction which is not parallel to the plane of said substrate, on which said at least one optical waveguide is secured (column 3, line 51 – column 4, line 23).

Regarding claim 8, Aksyuk teaches that said shutter actuation means comprises a flexible cantilever (18) on which said shutter means is mounted, said flexible cantilever being actuated by an associated electrostatic electrode, by applying voltage between said flexible cantilever and said electrostatic electrode (column 3, line 23 – column 5, line 20).

Regarding claim 9, Aksyuk teaches that said shutter actuation means is operable by at least one force selected from the group of forces including electrostatic force, magnetic force, thermal expansion force, and pneumatic force (column 3, line 23 – column 5, line 20).

Regarding claim 10, Aksyuk teaches that the cantilever is fabricated with holes (column 4, lines 24-55).

Regarding claim 13, Aksyuk teaches integrated optical power monitoring means for control of the optical power in at least one of said segments of said at least one optical waveguide (column 2, lines 23-33 and column 4, line 64 – column 5, line 20).

Regarding claim 17, Aksyuk teaches a method for assembling a MEMS variable optical attenuator device (Figures 1 and 4, column 1, line 63 – column 2, line 18), comprising the steps of: providing a substrate (19) having formed therein means for securing (20A) at least one optical waveguide; providing at least one optical waveguide (11,12) and securing on the substrate, forming a gap (13) in the optical waveguide once it is secured by said securing means, so as to form two optical waveguide segments (11 and 12) thereby insuring optical alignment between said optical waveguide segments (column 1, line 63 – column 2, line 18, column 2, line 53 – column 3, line 6, column 3, lines 23-50), mounting shutter means (14) proximate said gap (Figures 1 and 4) formed in said at least one optical waveguide, said shutter means being movable inside said gap (Aksyuk claims 3 and 9), in a dynamically variable amount as required, so as to block controllably a portion of the power of an optical signal propagating in said gap (column 3, lines 23-50), between said optical waveguide segments; and providing shutter actuation means (15,16) to move said shutter means controllably and dynamically to any required position within said gap.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk.

Regarding claims 3 and 4, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach that the at least one optical waveguide is a polarization maintaining optical waveguide or a polarization maintaining fiber. However, Aksyuk teaches that the optical waveguide can be any suitable optical waveguide or fiber (column 1, line 63 – column 2, line 18). Furthermore, polarization maintaining waveguides and fibers are common within the art. It would have been obvious to one of ordinary skill in the art at the time of the art to include a polarization maintaining optical waveguide or fiber as the at least one optical waveguide of Aksyuk. The motivation would have been to increase the functionality of the variable optical attenuator of Aksyuk.

Regarding claim 14, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach electronic means for providing automatic control of said shutter actuation means, for controllably and dynamically moving said shutter means to any required position within said gap. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide electronic means for providing automatic

control of the shutter actuation means in the device of Aksyuk, since it has been held that broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art {In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958)}. The motivation would have been to improve the ease, accuracy, and precision of the actuation.

Regarding claim 16, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach a plurality of optical waveguides and a corresponding plurality of gaps, associated shutter means and associated shutter actuation means, wherein each of said plurality of shutter actuation means is operable independently. However, such a duplication of parts would merely provide multiple, identical, independent variable optical attenuators, none of which provide functionality not already found in the variable optical attenuator of Aksyuk. Therefore, it would have been obvious to one of ordinary skill in the art to provide a plurality of optical waveguides, corresponding gaps, and associated shutter and shutter actuation means, since it has been held that mere duplication of the essential working parts has no patentable significance unless a new and unexpected result is produced { In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)}. The motivation would have been to increase the utility of the device by providing for attenuation of multiple optical signals.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk in view of US 2004/0120682 to Bhagavatula et al.

Regarding claim 5, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach that the securing means comprises a groove formed in the substrate. Bhagavatula teaches a securing means for securing an optical waveguide (22) to a substrate(12) wherein the securing means comprises a groove (14) formed in the substrate (paragraphs 3, 13, and 21-23). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the securing means of Aksyuk to include a groove formed in the substrate, as taught by Bhagavatula. The motivation would have been to improve alignment of the optical waveguides and to increase resistance to shear forces (paragraph 3).

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk in view of US 2003/0002809 to Jian.

Regarding claims 11 and 12, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach that the device is assembled by self-aligned vertical integration. Jian teaches a variable optical attenuator that is assembled by self-aligned vertical integration (paragraphs 10-12, 151-160 and 201). It would have been obvious to one of ordinary skill in the art at the time of the invention to assemble the device of Aksyuk by self-aligned vertical integration, as taught by Jian. The motivation would have been to reduce manufacturing costs (paragraph 154).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0031305 to Ticknor et al.

Regarding claim 15, Aksyuk teaches the limitations of the base claim 1. Aksyuk does not teach index matching fluid filling the gap formed in the at least one waveguide. Ticknor teaches a variable optical attenuator wherein the gap (407) between waveguide sections is filled with an index matching fluid (paragraph 34). It would have been obvious to one of ordinary skill in the art at the time of the invention to fill the gap between waveguide sections of Aksyuk with an index matching fluid, as taught by Ticknor. The motivation would have been to allow for increased gap distance, reduced rotation, and reduced criticality of the rotation angle thereby improving reduction of back-reflections (paragraph 34).

Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aksyuk in view of US 5,727,099 to Harman.

Regarding claims 18-20, Aksyuk teaches the limitations of the base claim 17. Aksyuk does not teach that gap forming step is formed by dicing, etching, or laser cutting. Harman teaches forming a gap (30) between optical waveguide sections (28, 32) by dicing, etching, or laser cutting (column 4, lines 45-67). It would have been obvious to one of ordinary skill in the art at the time of the invention to form the gap of Aksyuk by dicing, etching, or laser cutting, as taught by Harman. The motivation would have been to improve the precision of the formation of the gap.

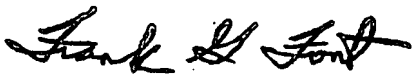
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Martin Blevins whose telephone number is 571-272-8581. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JMB



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800